SERVICE MANUAL

FISHER

CA-2320

Stereo Amplifier

(EUROPE)

The first name in high fidelity

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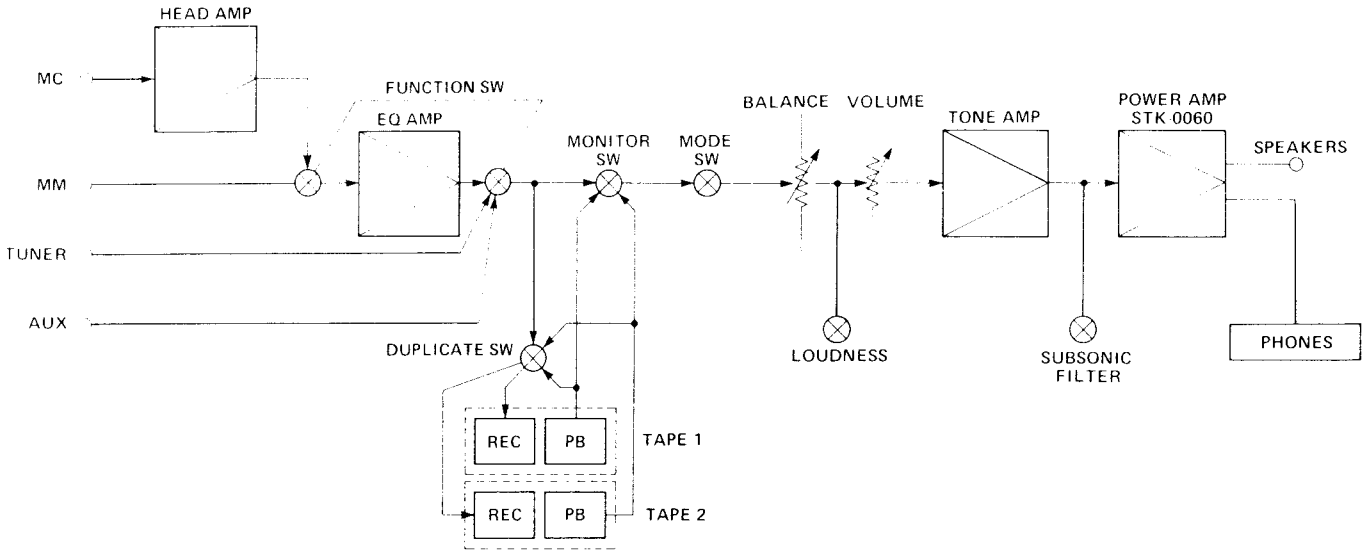
FUNCTIONAL BLOCK DIAGRAM



SPECIFICATIONS

AMPLIFIER		CA-2320
POWER AMPLIFIER SECTION Continuous RMS sine wave power per channel within stated bandwidth at no more than stated distortion and with an 8 ohm load.		**60 Watts**
Power Band Width		**20 Hz - 20 kHz**
Total Harmonic Distortion		**0.02 %**
I.M. Distortion		0.02 %
Speaker Damping		50
PREAMPLIFIER SECTION		
Frequency Response	Phono 1 (MM) (20 Hz - 20 kHz)	±0.5 dB
	Phono 2 (MC) (20 Hz - 20 kHz)	±0.5 dB
	Aux. (20 Hz - 20 kHz)	±0.5 dB
Input Sensitivity and Impedance	Phono 1 (MM)	2.5 mV/50k ohm
	Phono 2 (MC)	60 μV/22 ohm
	Tape Monitor 1	150 mV/50k ohm
	Tape Monitor 2	150 mV/50k ohm
	Tuner	150 mV/50k ohm
	Auxiliary	150 mV/50k ohm
Phono Max. Input Capability		
	Phono 1 (MM)	230 mV
	Phono 2 (MC)	6 mV
Tone Control	Bass (100 Hz)	±10 dB
	Treble (10 kHz)	±10 dB
Filter	Subsonic at 20 Hz (6 dB/Oct.)	−3 dB
Loudness Contour (100 Hz/10 kHz)		+8 dB/+3 dB
Hum and Noise (IHF Short Circuit, A Net Work)	Phono 1 (MM)	80 dB
	Phono 2 (MC) 22 Ω shorted	65 dB
	Tape Monitor	100 dB
	Tuner	100 dB
	Auxiliary	100 dB
Output Level and Impedance	Pre Out	1000 mV/2.2 k ohm
GENERAL Power Requirements		AC: 110/220 V 300 W/375 VA
Dimensions (W x D x H)		440 x 310 x 89.5 mm
Weight		9.2 kg

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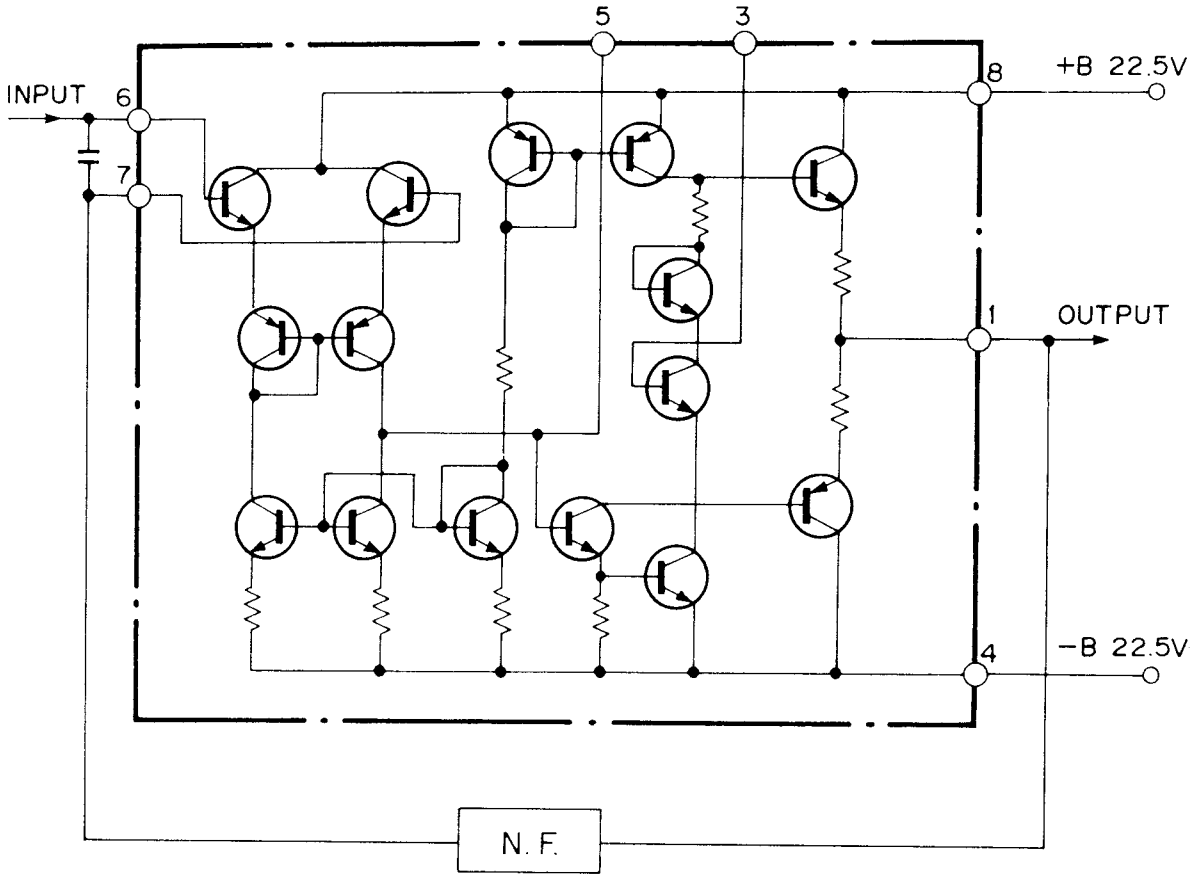
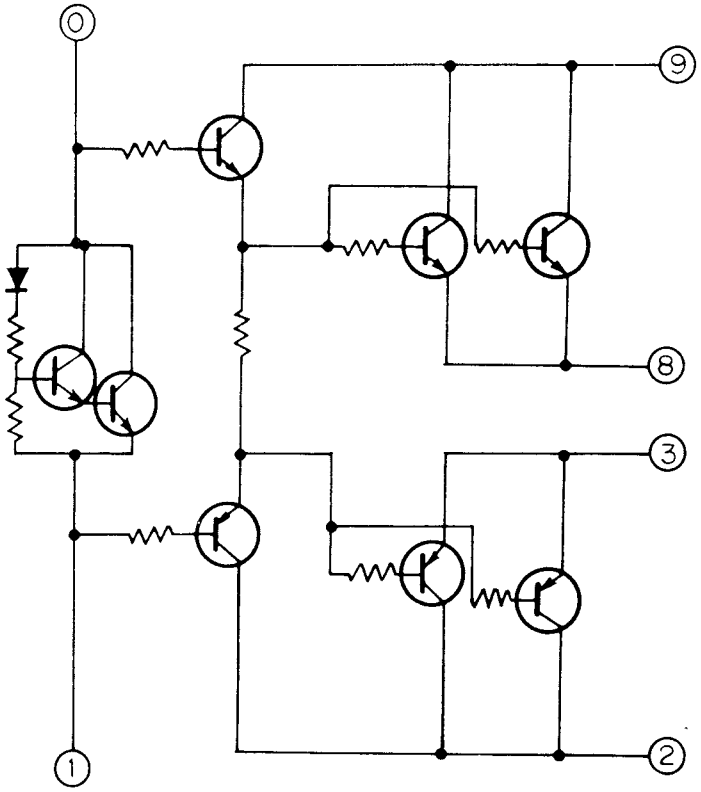
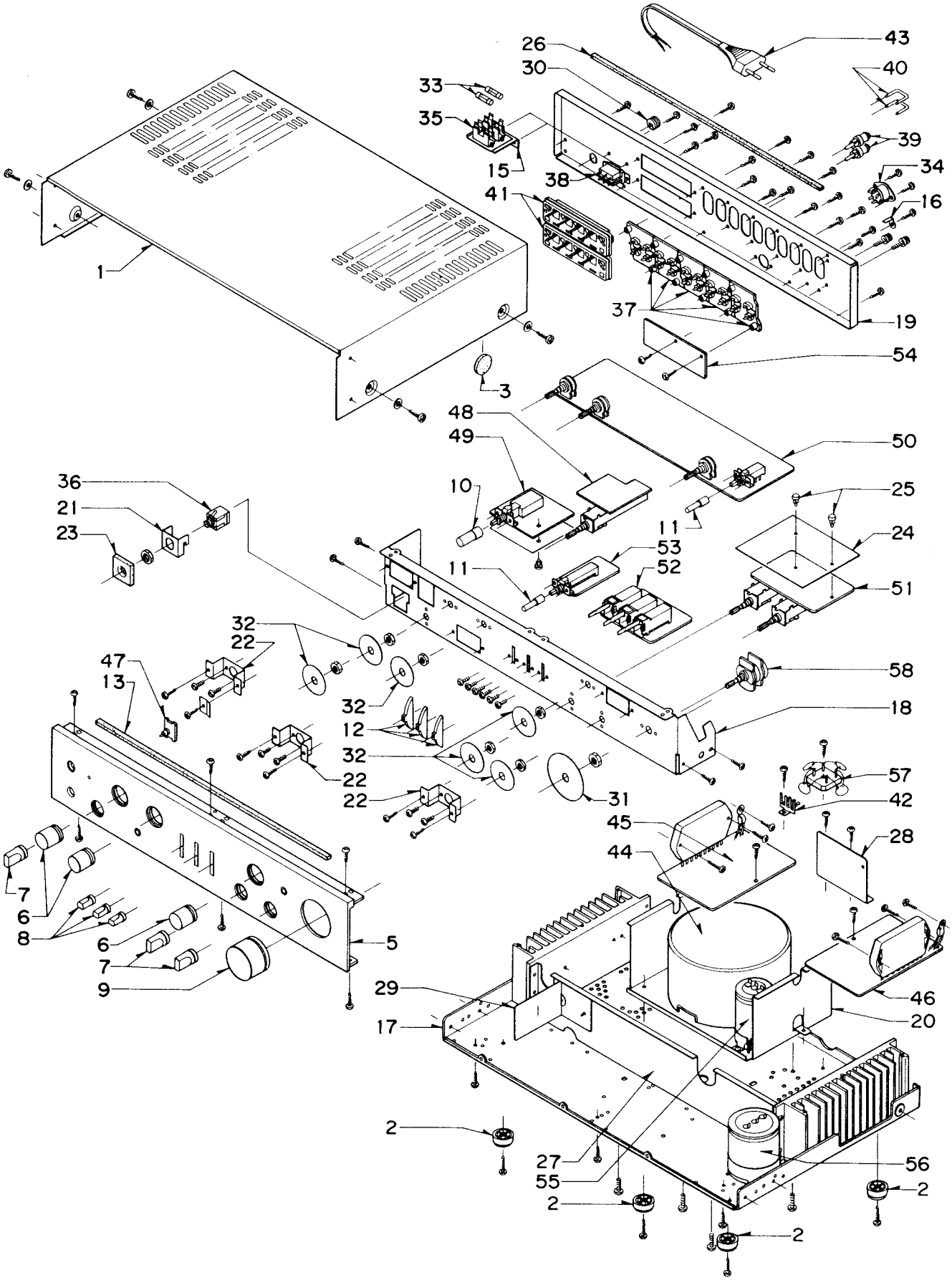
TONE AMP IC HA1457 EQUIVALENT CIRCUIT



POWER AMP IC STK0060 EQUIVALENT CIRCUIT



CABINET & CHASSIS EXPLODED VIEW



PARTS LIST

PACKING PARTS LIST

Ref. No.	Parts Number	Description
	131 6 1139 72417	Box Corrugate-EXP
	131 6 2119 01441	Bag Polyethylene-EXP
	131 6 3009 26910	Pad
	131 6 3069 16220	Patching Sheet
	131 6 4559 10700	Manufacturing No.

ACCESSORIES PARTS LIST

Ref. No.	Parts Number	Description
	131 2 1801 13900	Leg
	131 6 2719 10801	Bag Fan
	131 6 2719 11300	Bag Fan
	131 6 4119 72804	Explanatory Booklet
	131 6 4519 15700	Guarantee Card

CABINET PARTS LIST

Ref. No.	Parts Number	Description
1	131 2 1410 21502	Cover
2	131 2 1801 12900	Leg
3	131 2 1801 13900	Leg

APPEARANCE PARTS LIST

Ref. No.	Parts Number	Description
5	131 0 1016 29802	Panel Decorate Assy (Silver)
	131 0 1016 29803	Panel Decorate Assy (Black)
6	131 0 1001 47900	Knob Balance, Bass, Treble (Silver)
	131 0 1001 47903	Knob Balance, Bass, Treble (Black)
7	131 0 1001 48000	Knob Speaker, Function Mode (Silver)
	131 0 1001 48003	Knob Speaker, Function Mode (Black)
8	131 0 1001 48100	Knob Lever (Silver)
	131 0 1001 48103	Knob Lever (Black)
9	131 0 1001 48201	Knob Main Volume (Silver)
	131 0 1001 48206	Knob Main Volume (Black)
10	131 0 1001 52600	Knob Power Push (Silver)
	131 0 1001 52601	Knob Power Push (Black)
11	131 0 1001 48400	Knob Push Switch (Silver)
	131 0 1001 48403	Knob Push Switch (Black)
12	131 2 1601 52800	Knob Lever (Silver)
	131 2 1601 52802	Knob Lever (Black)
13	131 2 5205 15300	Cushion

CHASSIS PARTS LIST

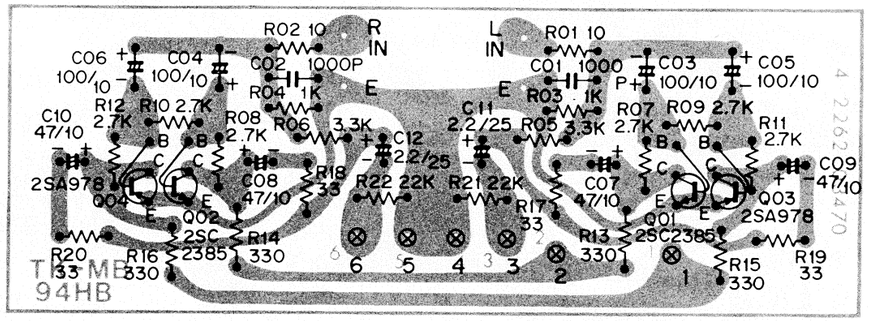
Ref. No.		Parts Number	Description
15		131 2 3101 63300	Metal Mount (Fuse)
16		4 2379 21520	Terminal Lug 1P
17	*	131 2 3301 24402	Chassis
18	*	131 2 3305 24401	Panel Front
19	*	131 2 3306 29401	Panel Rear
20		131 2 3617 17100	Metal Mount Transformer
21		131 2 3624 12800	Mount Headphone Jack
22		131 2 3701 21900	Mount Electric Part
23		131 2 4208 20400	Spacer (Headphone)
24		131 2 4208 28600	Spacer (Tone P.C.B.)
25		131 2 4221 00600	Rivet
26		131 2 5205 15300	Cushion
27		131 2 6101 25400	Plate Shield
28		131 2 6101 25501	Plate Shield (Head Amp P.C.B.)
29		131 2 6101 26000	Plate Shield
30		131 2 6111 14200	Bushing (AC Cord)
31		131 2 6113 31700	Shelter (Main VR)
32		131 2 6113 31800	Shelter (VR, Rotary Switch)

ELECTRICAL PARTS LIST

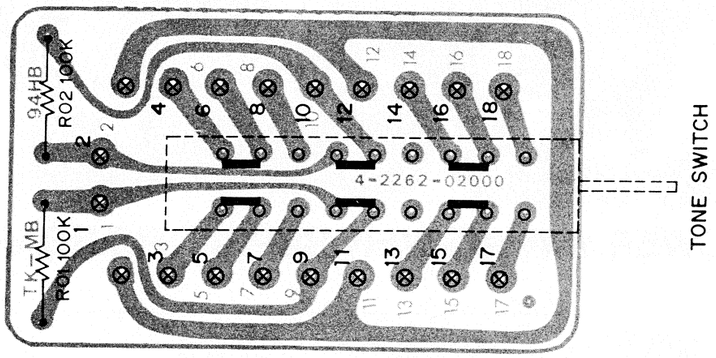
Ref. No.		Parts Number	Description
33		4 2349 20590	Fuse 4A
34		4 2359 20191	Socket 5P (DIN)
35		4 2359 21021	Fuse Holder
36		4 2352 00030	Jack Headphone
37		4 2359 22710	Socket 4P
38		4 2312 01020	Slide Switch
39		4 2369 20561	Plug 1P
40		4 2369 21220	Short Plug (Pre-Main Coupling)
41		4 2379 21801	Speaker Terminal
42		4 2379 21840	Terminal
43		4 2439 20526	Power Cord
44		4 2512 08120	Power Transformer
45	*	131 0 4001 01950	Power Amp Protector P.C.B. Assy
46	*	131 0 4001 01960	Power Amp/Power Supply P.C.B.
47	*	131 0 4001 01970	L.E.D. P.C.B. Assy
48	*	131 0 4001 01980	Speaker Switch P.C.B. Assy
49	*	131 0 4001 02490	Power Switch P.C.B. Assy
50	*	131 0 4001 02000	EQ Pre P.C.B. Assy
51	*	131 0 4001 00600	Function Switch P.C.B. Assy
52	*	131 0 4001 00610	Tape Switch P.C.B. Assy
53	*	131 0 4001 00620	Tone Switch P.C.B. Assy
54	*	131 0 4001 02010	MC Head AMP P.C.B. Assy
55(C01)		4 2232 00200	Electrolytic 3300 μF 57V
56(C02)		4 2232 00190	Electrolytic 6800 μF 57V
C03,04 05,06		C2HYDP103A	Ceramic 0.01 μF 500V +100,–0
C07,08 09		C1HYDZ473A	Ceramic 0.047 μF 50V +80,–20
57(D01)		DDD-S5VB20	Diode, S5VB20
R01,02		R3AXPK121A	Oxide Metal Film 120 1W ±10%
R03,04		R2EDPJ334A	Carbon 330k 1/4W ±5%
58		4 2222 00930	VR 200k-Ax2 (Volume)

* —Not a servie part.

MC HEAD AMP P.C.BOARD



TONE SW P.C.BOARD



PARTS LIST

MC HEAD AMP P.C.B. Assy
131 0 4001 02010

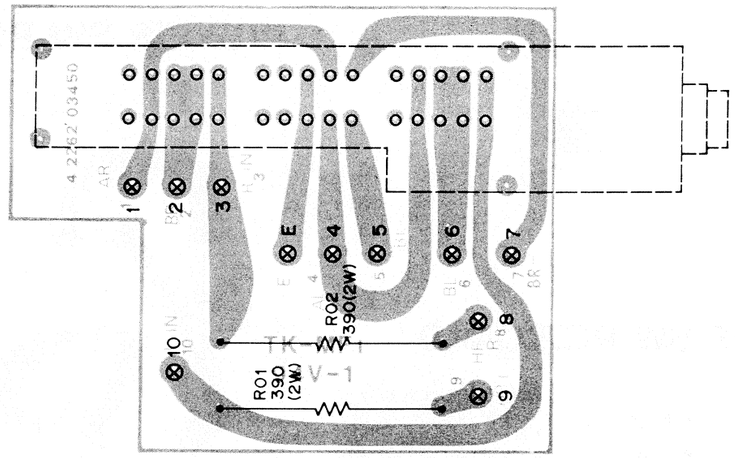
Ref. No.	Parts Number	Description
	CAPACITORS	
C01,02	C1HYSZ102A	Ceramic 0.001 μF 50V +80,–20%
C03,04 05,06	C1ARB-107A	Electrolytic 100 μF 10V
C07,08 09,10	C1ARB-476A	Electrolytic 47 μF 10V
C11,12	C1EUBM225A	Sint. Alu. 2.2 μF 25V ±20%
	SEMICONDUCTORS	
Q01,02	TMM-2SC2385-F	TR 2SC2385 F, G
Q03,04	TMM-2SA978--F	TR 2SA978 F, G

Ref. No.	Parts Number	Description			
	RESISTORS				
R01,02	R2EDUJ100A	Carbon	10	1/4W	±5%
R03,04	R2EDUJ102A	Carbon	1k	1/4W	±5%
R05,06	R2EDUJ332A	Carbon	3.3k	1/4W	±5%
R07,08 09,10 11,12	R2EDUJ272A	Carbon	2.7k	1/4W	±5%
R13,14 15,16	R2EDUJ331A	Carbon	330	1/4W	±5%
R17,18 19,20	R2EDUJ330A	Carbon	33	1/4W	±5%
R21,22	R2EDUJ223A	Carbon	22k	1/4W	±5%

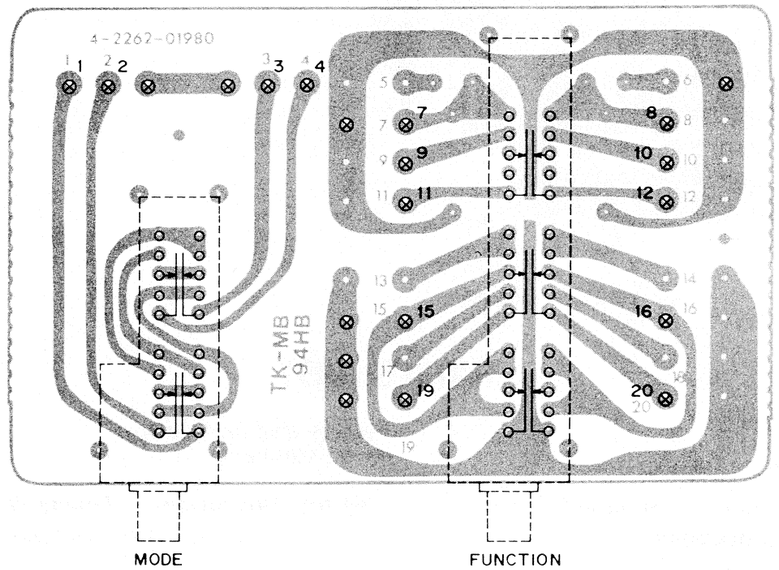
TONE SWITCH P.C.B. Assy
131 0 4001 00620

Ref. No.	Parts Number	Description			
	4 2312 01280	Switch Push 1 Key			
	RESISTORS				
R01,02	R2EDZJ104APA	Carbon	100k	1/4W	±5%

SPEAKER SW P.C.BOARD



FUNCTION P.C.BOARD



PARTS LIST

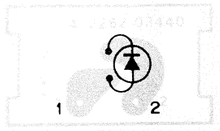
SPEAKER SWITCH P.C.B. Assy
131 0 4001 01980

Ref. No.	Parts Number	Description
SW01	4 2312 02020	Rotary Slide
	RESISTORS	
R01,02	R3DXBJ391A	Oxide Metal Film 390 2W ±5%

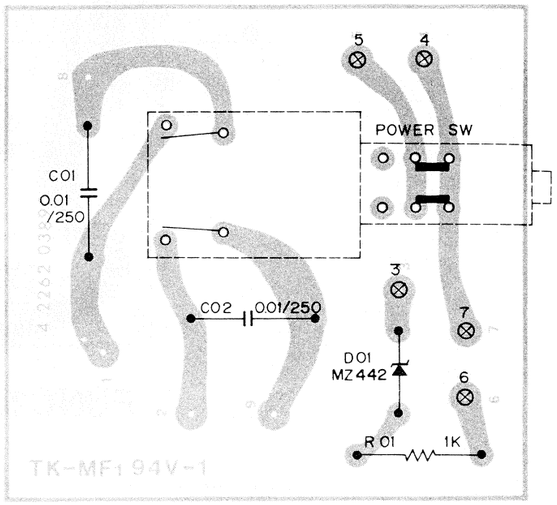
FUNCTION SWITCH P.C.B. Assy
131 0 4001 00600

Ref. No.	Parts Number	Description
	4 2312 01250	Slide Rotary
	4 2312 01260	Slide Rotary

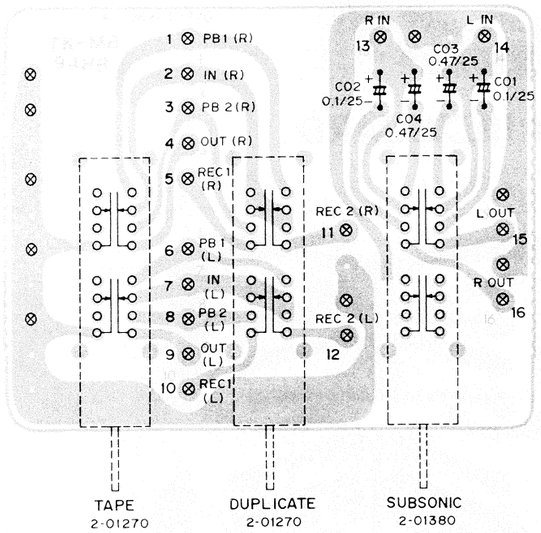
L.E.D. P.C.BOARD



POWER SW P.C.BOARD



TAPE SW P.C.BOARD



PARTS LIST

L.E.D. P.C.B. Assy
131 0 4001 01970

Ref. No.	Parts Number	Description
	SEMICONDUCTORS	
	DOO-SLP-132B	Diode, SLP-132B

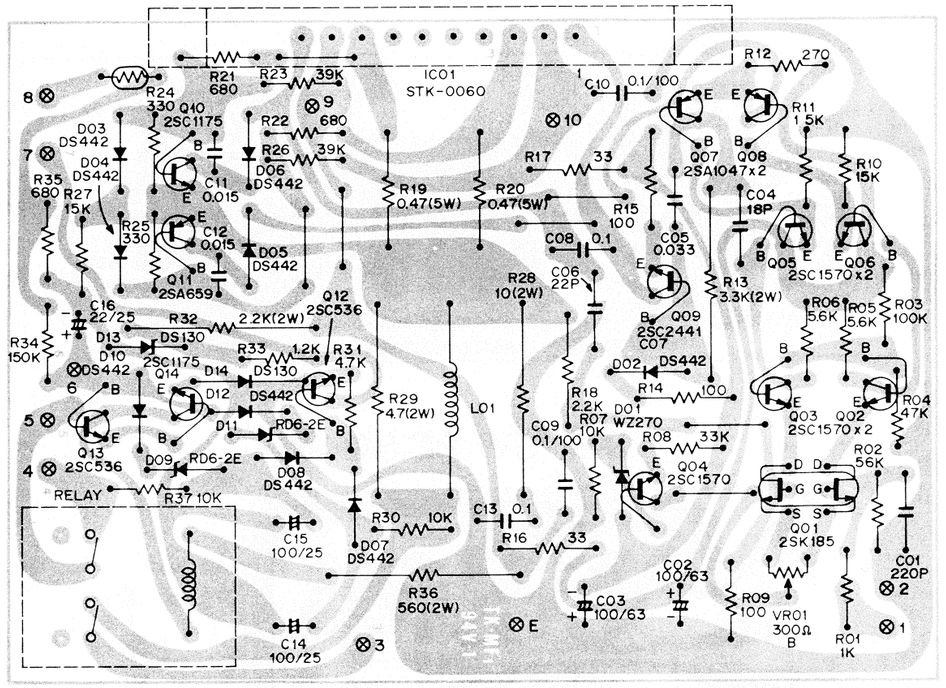
TAPE SWITCH P.C.B. Assy
131 0 4001 00610

Ref. No.	Parts Number	Description
S01,02	4 2312 01270	Switch Lever (Monitor, Dubbing)
S03	4 2312 01380	Switch Lever (DC-AC Switch)
	CAPACITORS	
C01,02	C1EUBM104A	Sint. Alu. 0.1 μF 25V ±20%
C03,04	C1EUBM474A	Sint. Alu. 0.47 μF 25V ±20%

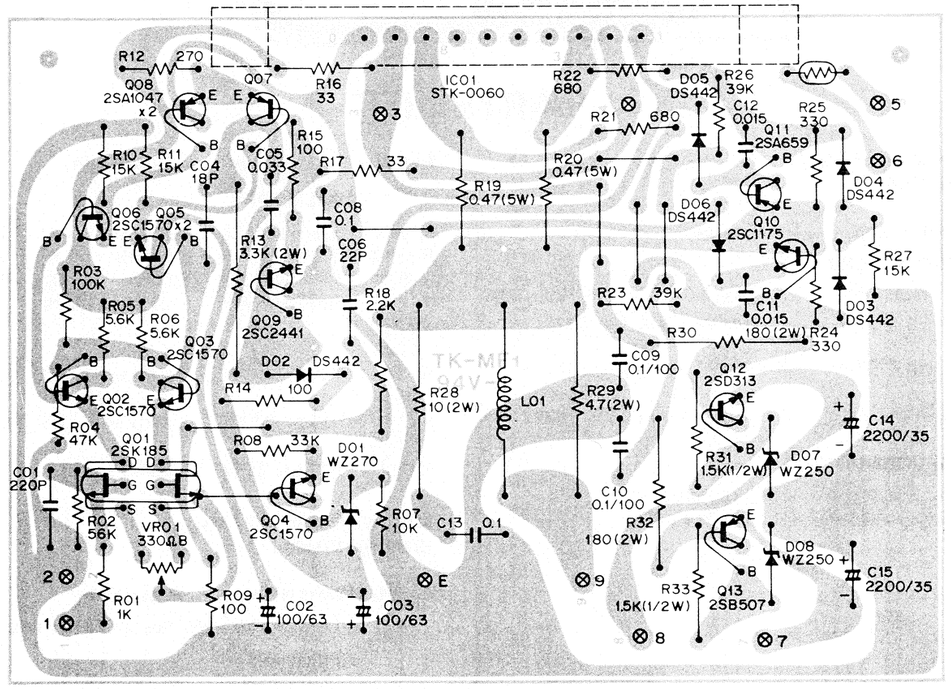
POWER SWITCH P.C.B. Assy
131 0 4001 02490

Ref. No.	Parts Number	Description
	4 2312 01400	Push Power
	CAPACITORS	
C01,02	C2EHRM103A	Metallized Paper 0.01 μF 250V ±20%
	SEMICONDUCTORS	
D01	DMZ-MZ422---B	Diode, MZ442
	RESISTORS	
R01	R2HCPK102A	Solid 1k 1/2W ±10%

POWER AMP/PROTECTOR P.C.BOARD



POWER AMP/POWER SUPPLY P.C.BOARD



PARTS LIST

POWER AMP/PROTECTOR P.C.B. Assy
131 0 4001 01950

Ref. No.	Parts Number	Description
	4 2229 25500	VR 330-Bx1
	4 2322 00010	Relay
L01	4 2539 20281	Coil
	HLL-PTH487A-BE	Posistor
	131 2 6201 25600	Plate Heat Sink
	CAPACITORS	
C01	C1HCZK221BPA	Ceramic 220 pF 50V ±10%
C02,03	C1JRE-107A	Electrolytic 100 μF 63V
C04	C1HCZJ180SPA	Ceramic 18 pF 50V ±5%
C05	C1HFAJ333A	Mylar 0.033 μF 50V ±5%
C06	C1HCZJ220SPA	Ceramic 22 pF 50V ±5%
C08	C1HFAJ104A	Mylar 0.1 μF 50V ±5%
C09,10	C2AFRK104A	Mylar 0.1 μF 100V ±10%
C11,12	C1HFAJ153A	Mylar 0.015 μF 50V ±5%
C13	C1HFAJ104A	Mylar 0.1 μF 50V ±5%
C14,15	C1EAEN107A	Electrolytic 100 μF 25V ±30%
C16	C1ERY-226APA	Electrolytic 22 μF 25V
	SEMICONDUCTORS	
D01	DJJ-WZ270	Diode, WZ270
D02,03 04,05 06,07 08	205 5 9040 44210	Diode, DS-442
D09	DNN-RD6.2E	Diode, RD-6.2E
D10	205 5 9040 44210	Diode, DS-442
D11	DNN-RD6.2E	Diode, RD-6.2E
D12	205 5 9040 44210	Diode, DS-442
D13	DJJ-WZ-130	Diode, WZ-130
IC01	206 5 7260 06010	IC, STK-0060
Q01	TVV-2SK185	FET (Dual) 2SK185
Q02,03 04,05 06	203 5 5251 57079	TR 2SC1570 GL, HL
Q07,08	203 5 7521 04750	TR 2SA1047 E, F
Q09	203 5 7512 44150	TR 2SC2441 E, F
Q10	203 5 6711 17550	TR 2SC1175 E,F
Q11	203 5 6800 65950	TR 2SA659 E, F
Q12,13	203 5 5000 53660	TR 2SC536
Q14	203 5 6711 17550	TR 2SC1175 E, F
	RESISTORS	
R01	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R02	R2EDZJ563APA	Carbon 56k 1/4W ±5%
R03	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R04	R2EDZJ473APA	Carbon 47k 1/4W ±5%
R05,06	R2EDZJ562APA	Carbon 5.6k 1/4W ±5%
R07	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R08	R2EDZJ333APA	Carbon 33k 1/4W ±5%
R09	R2EDZJ101APA	Carbon 100 1/4W ±5%
R10,11	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R12	R2EDPJ271A	Carbon 270 1/4W ±5%
R13	R3DXBJ332A	Oxide Metal Film 3.3k 2W ±5%
R14	R2HZPK101A	Fuse 100 1/2W ±10%
R15	R2EDPJ101A	Carbon 100 1/4W ±5%
R16,17	R2HZPK330A	Fuse 33 1/2W ±10%
R18	R2HDPJ222A	Carbon 2.2k 1/2W ±5%
R19,20	R3HERKR47A	Cement 0.47 ±10%
R21,22	R2EDZJ681APA	Carbon 680 1/4W ±5%
R23	R2EDZJ393APA	Carbon 39k 1/4W ±5%
R24,25	R2EDZJ331APA	Carbon 330 1/4W ±5%
R26	R2EDZJ393APA	Carbon 39k 1/4W ±5%
R27	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R28	R3DXBJ100A	Oxide Metal Film 10 2W ±5%
R29	R3DXBJ4R7A	Oxide Metal Film 4.7 2W ±5%
R30	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R31	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R32	R3DXBJ222A	Oxide Metal Film 2.2k 2W ±5%
R33	R2EDZJ122APA	Carbon 1.2k 1/4W ±5%
R34	R2EDZJ154APA	Carbon 150k 1/4W ±5%
R35	R2EDZJ681APA	Carbon 680 1/4W ±5%
R36	R3DXBJ561A	Oxide Metal Film 560 2W ±5%
R37	R2EDZJ103APA	Carbon 10k 1/4W ±5%

POWER AMP/POWER SUPPLY P.C.B. Assy
131 0 4001 01960

Ref. No.	Parts Number	Description
	4 2229 25500	VR 330-Bx1
L01	4 2539 20281	Coil
	HLL-PTH487A-BE	Posistor
	131 2 6201 25600	Plate Heat Sink
	CAPACITORS	
C01	C1HCZK221BPA	Ceramic 220 pF 50V ±10%
C02,03	C1JRE-107A	Electrolytic 100 μF 63V
C04	C1HCZJ180SPA	Ceramic 18 pF 50V ±5%
C05	C1HFAJ333A	Mylar 0.033 μF 50V ±5%
C06	C1HCZJ220SPA	Ceramic 22 pF 50V ±5%
C08	C1HFAJ104A	Mylar 0.1 μF 50V ±5%
C09,10	C2AFRK104A	Mylar 0.1 μF 100V ±10%
C11,12	C1HFAJ153A	Mylar 0.015 μF 50V ±5%
C13	C1HFAJ104A	Mylar 0.1 μF 50V ±5%
C14,15	C1VRB-228A	Electrolytic 2200 μF 35V
	SEMICONDUCTORS	
D01	DJJ-WZ270	Diode, WZ270
D02,03 04,05 06	205 5 9040 44210	Diode, DS-442
D07,08	DJJ-WZ-250	Zener Diode, WZ-250
IC01	206 5 7260 06010	IC, STK-0060
Q01	TVV-2SK185	FET (Dual) 2SK185
Q02,03 04,05 06	203 5 5251 57079	TR 2SC1570 GL, HL
Q07,08	203 5 7521 04750	TR 2SA1047 E, F
Q09	203 5 7512 44150	TR 2SC2441 E, F
Q10	203 5 6701 17550	TR 2SC1175 E, F
Q11	203 5 6800 65950	TR 2SA659 E, F
Q12	203 5 8550 31340	TR 2SD313 D, E
Q13	203 5 8510 50740	TR 2SB507 D, E

PARTS LIST (Continued)

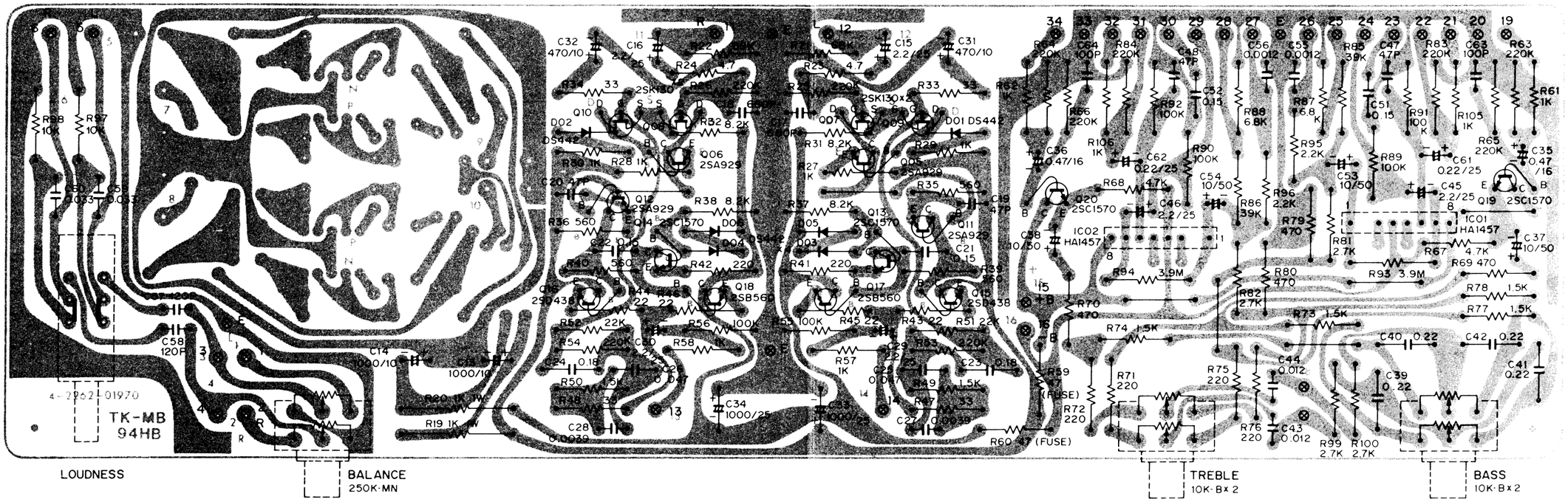
Ref. No.	Parts Number	Description
	RESISTORS	
R01	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R02	R2EDZJ563APA	Carbon 56k 1/4W ±5%
R03	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R04	R2EDZJ473APA	Carbon 47k 1/4W ±5%
R05,06	R2EDZJ562APA	Carbon 5.6k 1/4W ±5%
R07	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R08	R2EDZJ333APA	Carbon 33k 1/4W ±5%
R09	R2EDZJ101APA	Carbon 100 1/4W ±5%
R10,11	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R12	R2EDPJ271A	Carbon 270 1/4W ±5%
R13	R3DXBJ332A	Oxide Metal Film 3.3k 2W ±5%
R14	R2HZPK101A	Fuse 100 1/2W ±10%
R15	R2EDPJ101A	Carbon 100 1/4W ±5%
R16,17	R2HZPK330A	Fuse 33 1/2W ±10%
R18	R2HDPJ222A	Carbon 2.2k 1/2W ±5%
R19,20	R3HERKR47A	Cement 0.47 ±10%
R21,22	R2EDZJ681APA	Carbon 680 1/4W ±5%
R23	R2EDZJ393APA	Carbon 39k 1/4W ±5%
R24,25	R2EDZJ331APA	Carbon 330 1/4W ±5%
R26	R2EDZJ393APA	Carbon 39k 1/4W ±5%
R27	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R28	R3DXBJ100A	Oxide Metal Film 10 2W ±5%
R29	R3DXBJ4R7A	Oxide Metal Film 4.7 2W ±5%
R30	R3DXBJ181A	Oxide Metal Film 180 2W ±5%
R31	R2HXBJ152A	Oxide Metal Film 1.5k 1/2W ±5%
R32	R3DXBJ181A	Oxide Metal Film 180 2W ±5%
R33	R2HXBJ152A	Oxide Metal Film 1.5k 1/2W ±5%

EQ PRE P.C.B. Assy
131 0 4001 02000

Ref. No.	Parts Number	Description
	4 2312 01290	Switch Push 1 Key
VR01	4 2229 25380	VR 250k-MN
VR02,03	4 2222 00330	VR 10k-Bx2
	CAPACITORS	
C13,14	C1ARB-108A	Electrolytic 1000 μF 10V
C15,16	C1EUBM225A	Sint. Alu. 2.2 μF 25V ±20%
C17,18	C1HYYK681RPA	Ceramic 680 pF 50V ±10%
C19,20	C1HCDK470SL	Ceramic 47 pF 50V ±10%
C21,22	C1HFAK154A	Mylar 0.15 μF 50V ±10%
C23,24	C1HFRJ184A	Mylar 0.18 μF 50V ±5%
C25,26	C1HFAJ473A	Mylar 0.047 μF 50V ±5%
C27,28	C1HFAJ392A	Mylar 3900 pF 50V ±5%
C29,30	C1EUBM225A	Sint. Alu. 2.2 μF 25V ±20%
C31,32	C1ARB-477A	Electrolytic 470 μF 10V
C33,34	C1ERB-108A	Electrolytic 1000 μF 25V
C35,36	C1CUBX474A	Sint. Alu. 0.47 μF 16V +40,–20%
C37,48	C1HRE-106AL	Electrolytic 10 μF 50V
C39,40 41,42	C1HFRJ224A	Mylar 0.22 μF 50V ±5%
C43,44	C1HFAJ123A	Mylar 0.012 μF 50V ±5%
C45,46	C1EUBM225A	Sint. Alu. 2.2 μF 25V ±20%
C47,48	C1HCDK470SL	Ceramic 47 pF 50V ±10%
C51,52	C1HFAK154A	Mylar 0.15 μF 50V ±10%
C53,54	C1HRE-106AL	Electrolytic 10 μF 50V
C55,56	C1HFAJ122A	Mylar 1200 pF 50V ±5%
C57,58	C1HCSK121SL	Ceramic 120 pF 50V ±10%
C59,60	C1HFAJ333A	Mylar 0.033 μF 50V ±5%

Ref. No.	Parts Number	Description
	CAPACITORS	
C61,62	C1EUBM224A	Sint. Alu. 0.22 μF 25V ±20%
C63,64	C1HCYK101APA	Ceramic 100 pF 50V ±10%
	SEMICONDUCTORS	
D01,02 03,04 05,06	205 5 9040 44210	Diode, DS-442
IC01,02	IKK-HA1457	IC, HA1457
Q05,06	203 5 7000 92970	TR 2SA929 G, H
Q07,08 09,10	TNN-2SK130A-L	TR 2SK130A L, K
Q11,12	203 5 7000 92970	TR 2SA929 G, H
Q13,14	203 5 5251 57079	TR 2SC1570 GL, HL
Q15,16	203 5 6830 43850	TR 2SD438 E, F
Q17,18	203 5 6840 56050	TR 2SB560 E, F
Q19,20	203 5 5251 57079	TR 2SC1570 GL, HL
	RESISTORS	
R19,20	R3AXBJ102A	Oxide Metal Film 1k 1W ±5%
R21,22	R2EDZJ683APA	Carbon 68k 1/4W ±5%
R23,24	R2EDSJ4R7A	Carbon 4.7 1/4W ±5%
R25,26	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R27,28 29,30	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R31,32	R2EDZJ822APA	Carbon 8.2k 1/4W ±5%
R33,34	R2EDZJ330APA	Carbon 33 1/4W ±5%
R35,36	R2EDZJ561APA	Carbon 560 1/4W ±5%
R37,38	R2EDZJ822APA	Carbon 8.2k 1/4W ±5%
R39,40	R2EDZJ561APA	Carbon 560 1/4W ±5%
R41,42	R2EDZJ221APA	Carbon 220 1/4W ±5%
R43,44 45,46	R2EDZJ220APA	Carbon 22 1/4W ±5%
R47,48	R2EDZJ330APA	Carbon 33 1/4W ±5%
R49,50	R2EDZJ152APA	Carbon 1.5k 1/4W ±5%
R51,52	R2EDZJ223APA	Carbon 22k 1/4W ±5%
R53,54	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R55,56	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R57,58	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R59,60	R2HZPK470A	Fuse 47 1/2W ±10%
R61,62	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R63,64 65,66	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R67,68	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R69,70	R2EDZJ471APA	Carbon 470 1/4W ±5%
R71,72	R2EDSJ221A	Carbon 220 1/4W ±5%
R73,74	R2EDZJ152APA	Carbon 1.5k 1/4W ±5%
R75,76	R2EDSJ221A	Carbon 220 1/4W ±5%
R77,78	R2EDZJ152APA	Carbon 1.5k 1/4W ±5%
R79,80	R2EDZJ471APA	Carbon 470 1/4W ±5%
R81,82	R2EDZJ272APA	Carbon 2.7k 1/4W ±5%
R83,84	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R85,86	R2EDZJ393APA	Carbon 39k 1/4W ±5%
R87,88	R2EDZJ682APA	Carbon 6.8k 1/4W ±5%
R89,90 91,92	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R93,94	R2EDPJ395A	Carbon 3.9M 1/4W ±5%
R95,96	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R97,98	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R99,100	R2EDSJ272A	Carbon 2.7k 1/4W ±5%
R105,106	R2EDZJ102APA	Carbon 1k 1/4W ±5%

EQ PRE PRINTED CIRCUIT BOARD



RECOMMENDED TEST EQUIPMENT

The following test equipments are recommended to completely test and align the Amplifier:

- Line Voltage Isolation Transformer
- AC DC Multimeter.
- Accurately Calibrated AC Voltmeter.
- Oscilloscope (Flat to 100 kHz Minimum)
- Low-Distortion Audio Sine-Wave Generator
- Harmonic Distortion Analyzer
- Two (2) Load Resistors 8-ohms, 250 Watts (Minimum Rating)

HARMONIC DISTORTION TEST

CAUTION: Limit the following tests to no more than ten minutes each. Use 8-ohm resistors, with a minimum power rating of 250 watts when connecting a load across the SPEAKERS terminal.

CONTROL SETTINGS:

Unplug the AC power cord and set the front panel controls as follows:

- BASS, TREBLE, and BALANCE controls to center positions.
- POWER switch to OFF
- SPEAKERS switch to OFF
- FUNCTION switch to AUX
- MODE switch to STEREO
- TAPE MONITOR switch to SOURCE
- TAPE DUPLICATE switch to SOURCE
- TONE CONTROLS switch to OFF
- LOUDNESS and SUBSONIC switch to OFF
- VOLUME control to MINIMUM position
- LEFT CHANNEL DRIVEN

ONE CHANNEL DRIVEN:

1) Connect a low distortion audio generator to LEFT AUX IN jack. Set generator frequency to 1 kHz and output to minimum.

2) Connect an 8-ohm load resistor between SPEAKERS MAIN LEFT and COM terminals. Connect a Harmonic Distortion Analyzer and an AC VTVM in parallel across the 8-ohm load.

3) Connect the AC power cord and set SPEAKERS switch to MAIN. Turn VOLUME control to MAX.

4) Increase generator output for 60 Watts RMS (21.9 V across the 8-ohm load). Harmonic Distortion Analyzer should measure 0.02 % distortion or less.

5) Repeat steps 1 through 4 for RIGHT CHANNEL.

BOTH CHANNELS DRIVEN

Connect 8-ohm load resistors across LEFT and RIGHT MAIN SPEAKERS terminals. Set MODE switch to "MONO". Adjust generator output and "BALANCE" control for 60 Watts at Left and Right Channels (21.9 volts across the 8-ohm loads). Harmonic Distortion Analyzer should measure 0.02 % distortion or less at each channel.

CAUTION: This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistor equipment and printed circuitry.

ADJUSTMENT OF POWER AMPLIFIER P.C.BOARD

BEFORE ADJUSTMENT

1. After the power switch is turned ON, allow a few minutes before making adjustment, to be sure of the most stable operation.

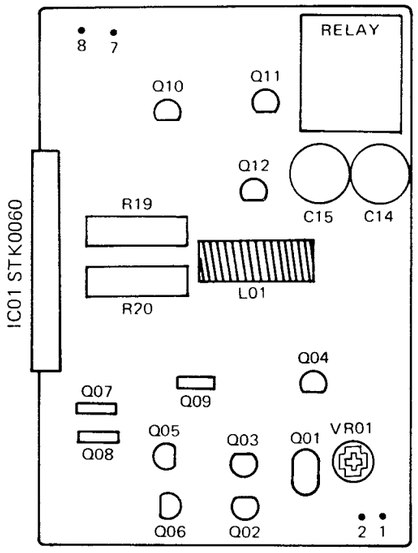
2. Connect dummy load resistors (8 ohms) to the SPEAKERS terminals.

3. Use a DC V.T.V.M. (input impedance: More than 50k ohms/V).

ZERO BALANCE ADJUSTMENT

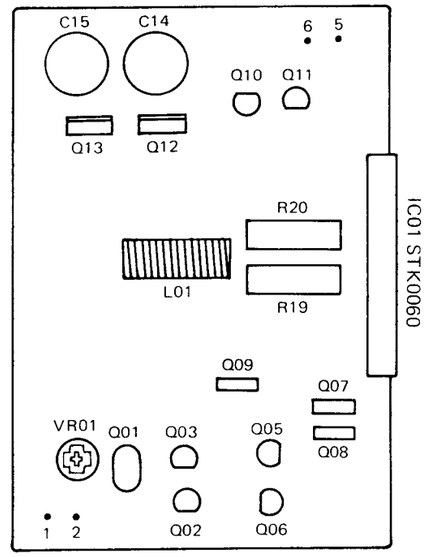
- Connect DC V.T.V.M. to the speaker output terminal and turn the volume contro fully to the minimum position. Turn VR01 in each P.C.B. under the above condition until the output voltage becomes 0 V.

POWER AMP/PROTECT BOARD LAYOUT



(TOP VIEW)

POWER AMP/POWER SUPPLY BOARD LAYOUT



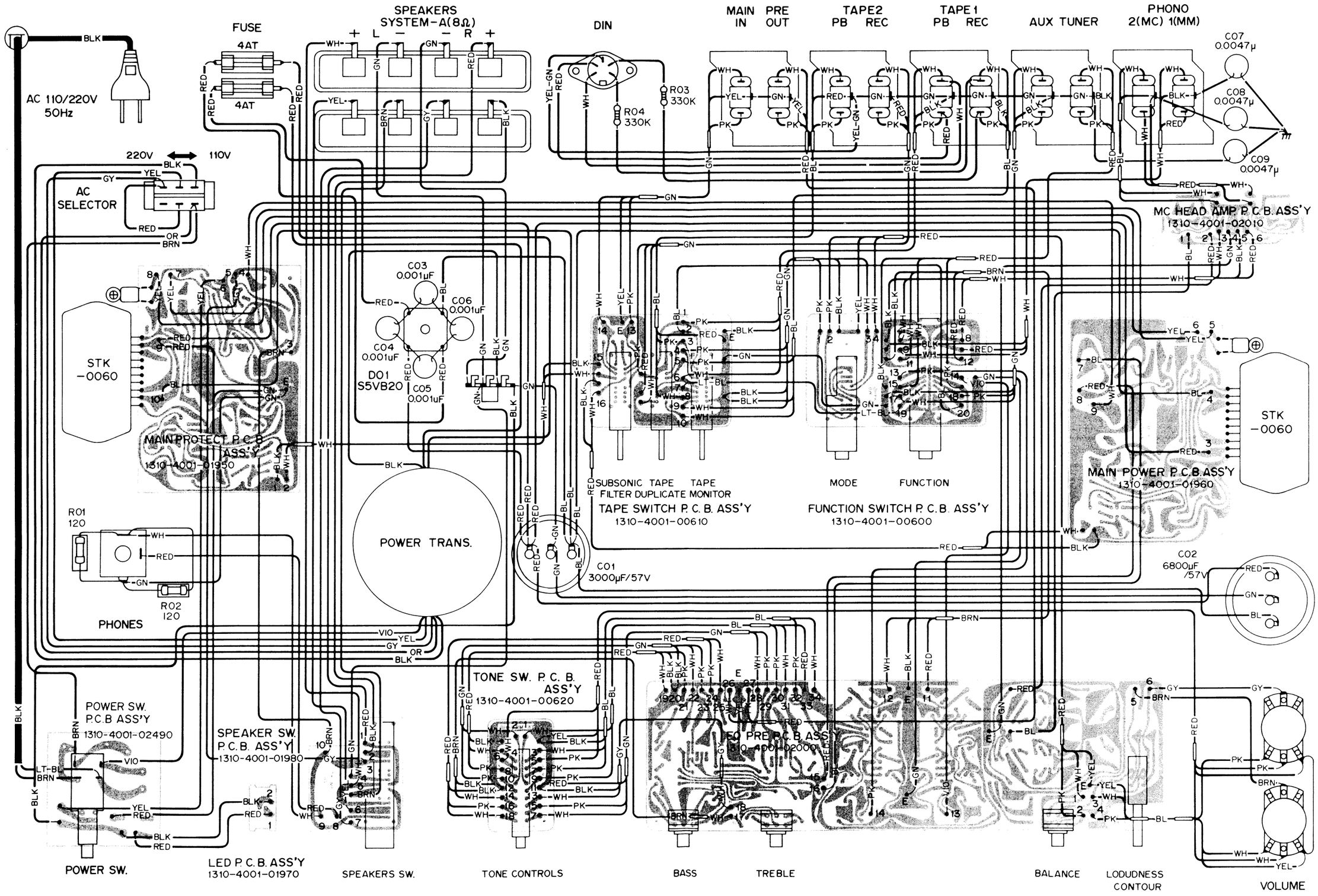
(TOP VIEW)

EXPLANATION OF PROTECTIVE CIRCUITS

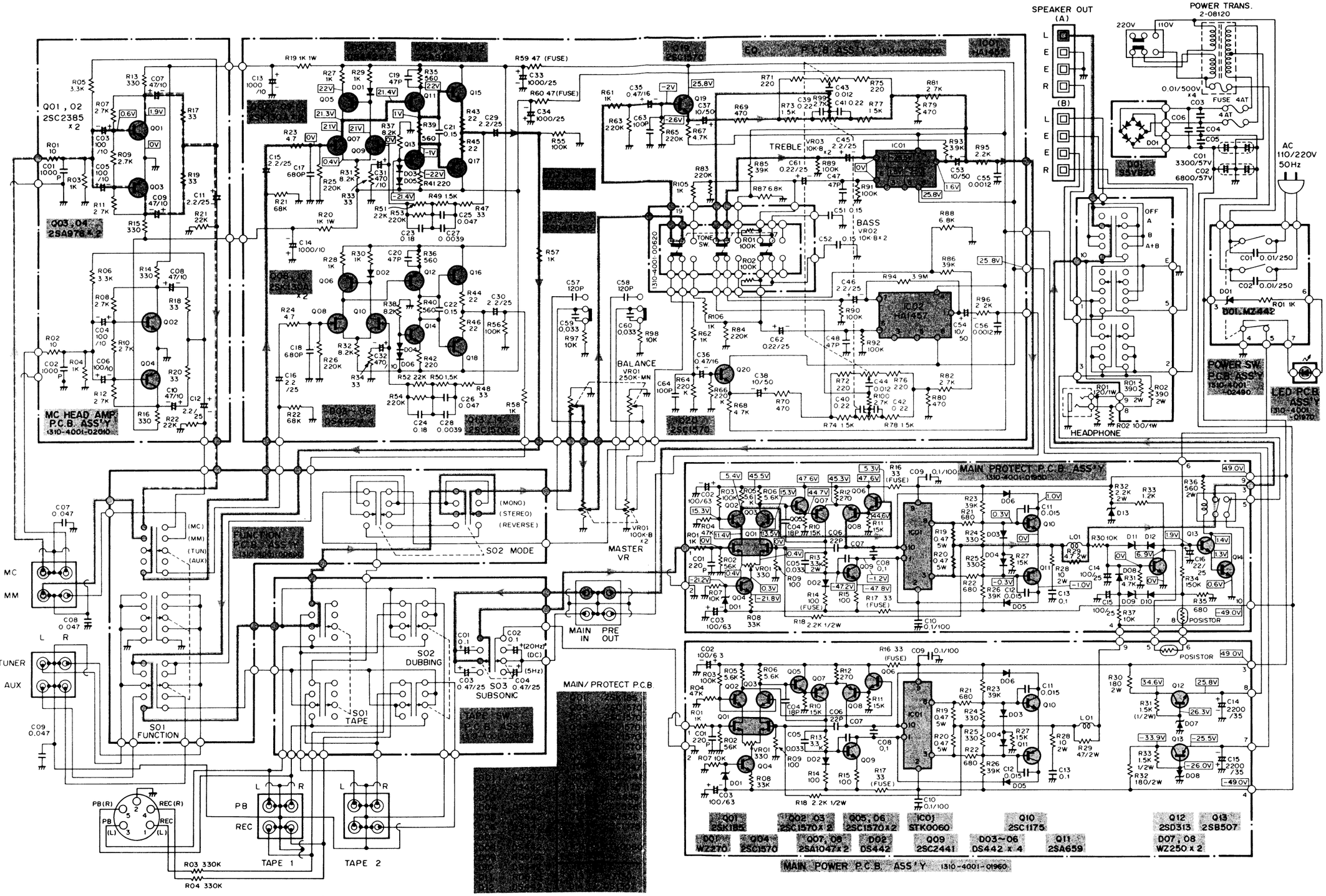
*For about two seconds after the power switch is turned on, the speakers remain silent because the power muting circuit operates during this time.

*If the speaker terminals are short-circuited or the ventilation holes at the cabinet top are blocked during long periods of operation, the internal temperature may rise abnormally. At about 90°C, the thermal sensor (temperature detection) circuit becomes activated and will interrupt the signal. If the cause is removed and the internal temperature is back to normal, the unit automatically resets itself to restore normal operation.

POINT TO POINT WIRING DIAGRAM



SCHEMATIC DIAGRAM

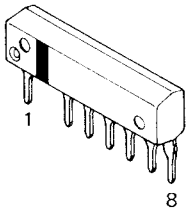


NOTES:

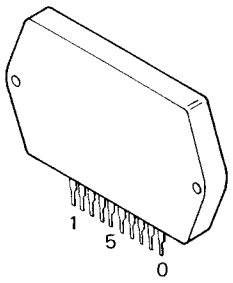
1. All resistors values are indicated in "ohm" ($K=10^3$, $M=10^6$).
2. All capacitors values are indicated in "μF" ($P=10^{-12}$).
3. All volatages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10% with respect chassis ground
   c. No signals at input terminals
   d. AC input 220 volts 50 Hz
4. This is a fundamental schematics diagram. Some products may be modified without notice.

SEMICONDUCTOR LEAD IDENTIFICATION

INTEGRATED CIRCUITS



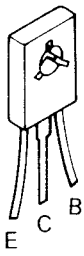
- HA1457



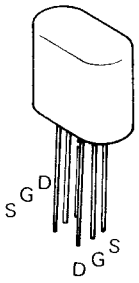
- STK0060

TRANSISTORS

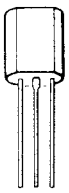
- 2SD313
- 2SB507



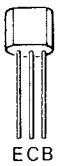
- 2SA1047
- 2SC2441



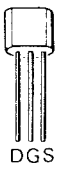
- 2SK185



- 2SD438
- 2SB560

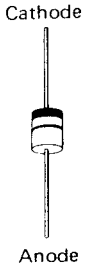


- 2SC2385
- 2SA978
- 2SC1570
- 2SC1175
- 2SA659
- 2SC536
- 2SA929

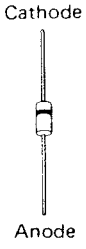


- 2SK130

DIODES



- DS130



- DS-442
- RD-6.2E
- WZ270
- WZ250
- WZ130

FISHER

Service:
FISHER HiFi Europa, Vertriebs-GmbH
Schönstraße 80, 8000 München 90
Telefon 089/23791

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PRINTED IN JAPAN

'79/Jun. **WM-4047**

MODIFICATION NOTICE

STEREO AMPLIFIER

FISHER

CA 2320 (USA)
CA 2320 (EUROPE)

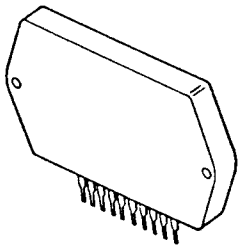
Date Mar. 29, 1982 Issued by _____

The following corrections should be made in the SERVICE MANUALS and PARTS (PRICE) LIST.

IC STK-0060 used in main PCB of Model CA2320 has been modified as shown below from the following production number.
The internal circuitry is identical, but the positions of mounting holes are different, so that the IC cannot be fitted to heat sink.

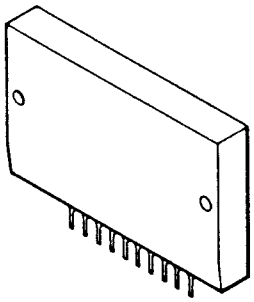
When ordering, specify whether old type or new type.

Old type



For USA, up to No. 850
For Europe, up to No. 2200

New type



For USA, from No. 851
For Europe, from No. 2201

~~INTERCHANGEABLE~~ NOT INTERCHANGEABLE	Serial No. Chassis No.	Effective from
Q'ty of initial production before modification.	Identification of modified unit.	
USA 850 EUROPE 2200		

REASON FOR MODIFICATION
A ..... Standardization
B ..... Change of materials
C ..... Improvement of reliability
D ..... Improvement of performance
E ..... Miss print
F ..... Miss register
G .....

Printed in Japan 5300

SANYO ELECTRIC TRADING CO., LTD.
OSAKA, JAPAN

WM- 7709